

CLAIMS:

1           1.     A system for streaming a software application to a client comprising:  
2                   an application library having application files and a prediction model  
3                   stored therein;  
4                   a streaming manager configured to send the application files to a client as a  
5                   plurality of streamlets, each streamlet corresponding to a particular data block in a respective  
6                   application file;  
7                   a streaming prediction engine configured to identify at least one streamlet which  
8                   is predicted to be most appropriate to send to a given client at a particular time in accordance  
9                   with the prediction model.

1           2.     The system of claim 1, wherein each streamlet corresponds to a file data  
2                   block having a size equal to a code page size used during file reads by an operating system  
3                   expected to be present on a client system.

1           3.     The system of claim 2, wherein the data block size is four kilobytes.

1           4.     The system of claim 1, wherein the application files are stored in the  
2                   application library as preprocessed streamlets, each streamlet corresponding to a data block in a  
3                   particular application file at a particular offset and having a predefined length.

1           5.     The system of claim 4, wherein the predefined length comprises a code  
2                   page size used during file reads by an operating system expected to be present on a client system.

1                   6.       The system of claim 4, wherein each preprocessed streamlet is  
2        compressed.

1                   7.       The system of claim 1, wherein the streaming manager is configured to  
2        send the client upon a first initiation of the streaming application, a file structure specification of  
3        the application files.

1                   8.       The system of claim 7, wherein the streaming manager is further  
2        configured to send the client upon the first initiation of the streaming application a set of  
3        streamlets comprising at least those streamlets containing the portions of the application required  
4        to enable execution of the application to be initiated.

1                   9.       The system of claim 8, wherein the application library has a startup block  
2        comprising the file structure specification and set of streamlets stored therein.

1                   10.      The system of claim 1, wherein the streaming manager is further  
2        configured to install streaming environment support software on the client prior to initiating an  
3        application streaming processes.

1                   11.      The system of claim 1, further comprising a differential prediction model  
2        associated with the client, the prediction engine configured to make streamlet predictions for the  
3        client in accordance with the default prediction model and the respective differential prediction  
4        model.

1                   12.     The system of claim 11, wherein the streaming manager is configured to,  
2     upon receipt of application usage tracking information from the client, update at least one of the  
3     differential prediction model for the client and the prediction model.

1                   13.     The system of claim 1, further comprising an application status repository  
2     comprising a data map for each active client, the data map generally indicating the streamlets  
3     which are present at the respective client.

1                   14.     The system of claim 13, wherein the streaming manager is configured to  
2     update the data map for the client upon a successful transmission of a streamlet to the client.

1                   15.     The system of claim 14, wherein the streaming manager is configured to,  
2     upon receipt of a request for a particular streamlet from the client:  
3                                    determine if the data map indicates that the client already has the  
4     requested streamlet;  
5                                    if the data map indicates that the requested streamlet is on the client  
6     system, request an updated data map from the client and replace the data map with a returned  
7     updated map;  
8                                    retrieve the requested streamlet from the application library; and  
9                                    update the data map upon a successful transmission of the requested streamlet to  
10    the client.

1           16.    The system of claim 15, wherein the streaming manager is further  
2    configured to, upon receipt of the streamlet request from the client, reposition the prediction  
3    engine in the default prediction model in accordance with the requested streamlet.

1           17.    The system of claim 13, wherein the streaming manager is configured to,  
2    upon receipt of an unsolicited data map from the client, replace the data map in the application  
3    status repository for the client with the data map received from the client.

1           18.    The system of claim 17, wherein the streaming manager is further  
2    configured to, upon receipt of the unsolicited data map, compare the data map in the application  
3    status repository for the client with the data map received from the client and log mismatches.

1           19.    A method for streaming a software application comprising the steps of:  
2            providing at a server an application library having application files stored therein;  
3            forwarding the application files to a client as a particular sequence of streamlets,  
4    each streamlet corresponding to a particular data block in a respective application file;  
5            determining the particular sequence of streamlets in accordance with a prediction  
6    model indicating which streamlets are most appropriate to send to a given client at a particular  
7    time.

1           20.    The method of claim 19, wherein each streamlet corresponds to a file data  
2    block having a size equal to a code page size used during file reads by an operating system  
3    expected to be present on a client system.

1           21. The method of claim 20, wherein the data block size is four kilobytes.

1           22. The method of claim 19, further comprising the step of dividing the  
2 application files into streamlets prior to initiation of a streaming session.

1           23. The method of claim 19, further comprising the step of storing the  
2 application files in the application library as preprocessed streamlets, each streamlet  
3 corresponding to a data block in a particular application file at a particular offset and having a  
4 predefined length.

1           24. The method of claim 23, wherein the predefined length comprises a code  
2 page size used during file reads by an operating system expected to be present on a client system.

1           25. The method of claim 23, further comprising the step of compressing each  
2 streamlet prior to storage in the application library.

1           26. The method of claim 19, further comprising the step of sending the client  
2 upon a first initiation of the streaming application a file structure specification of the application  
3 files.

1           27. The method of claim 26, further comprising the step of sending to the  
2 client upon the first initiation of the streaming application a set of streamlets comprising at least

3 those streamlets containing the portions of the application required to enable execution of the  
4 application to be initiated.

1 28. The method of claim 27, further comprising the step of storing in the  
2 application library a startup block comprising the file structure specification and set of streamlets  
3 stored therein.

1 29. The method of claim 19, further comprising the step of initiating a process  
2 to install streaming environment support software on the client prior to initiating an application  
3 streaming processes.

1 30. The method of claim 19, wherein the step of determining comprising  
2 determining the particular sequence of streamlets in accordance with the prediction model and a  
3 differential prediction model associated with the client.

1 31. The method of claim 30, further comprising the step of, upon receipt of  
2 application usage tracking information from the client, updating at least one of the differential  
3 prediction model for the client and the prediction model.

1 32. The method of claim 19, further comprising the steps of, upon receipt of a  
2 request for a particular streamlet from the client:  
3 retrieving the requested streamlet from the application library; and  
4 transmitting the streamlet to the client.

1           33.     The method of claim 19, further comprising the steps of:  
2                   providing a data map for each active client generally indicating the streamlets  
3                   which are present at the respective client; and  
4                   updating the data map associated with a particular client upon a successful  
5                   transmission of a streamlet to the particular client.

1           34.     The method of claim 33, further comprising the steps of, upon receipt of a  
2                   request for a particular streamlet from the client:  
3                   determining if the data map associated with the client indicates that the  
4                   already has the requested streamlet; and  
5                   in response to a positive determination, requesting an updated data map  
6                   from the client and replacing the data map with a returned updated map.

7  
8           35.     The method of claim 34, further comprising the step of adjusting a  
9                   position in the prediction model for the client in accordance with the requested streamlet.

1           36.     The method of claim 33, further comprising the step of, upon receipt of an  
2                   unsolicited data map from the client, replacing the data map in the application status repository  
3                   for the client with the data map received from the client.

1           37.     The method of claim 36, further comprising the steps of:  
2                   comparing the data map in the application status repository for the client with the  
3                   unsolicited data map received from the client; and

4 logging mismatches identified during the comparing step.

1           38. A computer program product stored on a computer readable medium, the  
2 product comprising a computer program for configuring a server with an application library  
3 having application files stored therein to stream the application to a client, the computer program  
4 comprising code to configure the server to:

5           forward the application files to a client as a particular sequence of streamlets, each  
6 streamlet corresponding to a particular data block in a respective application file; and  
7           determine the particular sequence of streamlets in accordance with a prediction  
8 model indicating which streamlets are most appropriate to send to a given client at a particular  
9 time.

1           39. The computer program product of claim 38, the computer program further  
2 comprising code to further configure the server to divide the application files into streamlets  
3 prior to initiation of a streaming session.

1           40. The computer program product of claim 39, the computer program further  
2 comprising code to configure the server to divide the application files into streamlets  
3 corresponding to a data block in a particular application file at a particular offset and having a  
4 predefined length.

1           41. The computer program product of claim 38, the computer program further  
2 comprising code to configure the server to send the client upon a first initiation of the streaming  
3 application a file structure specification of the application files.

1                   42. The computer program product of claim 41, the computer program further  
2 comprising code to send to the client upon the first initiation of the streaming application a set of  
3 streamlets comprising at least those streamlets containing the portions of the application required  
4 to enable execution of the application to be initiated.

1                   43. The computer program product of claim 42, the computer program further  
2 comprising code to store in the application library a startup block comprising the file structure  
3 specification and set of streamlets stored therein.

1                   44. The computer program product of claim 38, the computer program further  
2 comprising code to install streaming environment support software on the client prior to  
3 initiating an application streaming processes.

1                           46. The computer program product of claim 45, the computer program further  
2 comprising code to, upon receipt at the server of application usage tracking information from the  
3 client, update at least one of the differential prediction model for the client and the prediction  
4 model

1           47.     The computer program product of claim 38, the computer program further  
2 comprising code to, upon receipt at the server of a request for a particular streamlet from the  
3 client:

4                 retrieve the requested streamlet from the application library; and  
5                 transmit the streamlet to the client.

1           48.     The computer program product of claim 38, the computer program further  
2 comprising code to:

3                 provide a data map for each active client generally indicating the streamlets which  
4 are present at the respective client; and  
5                 update the data map associated with a particular client upon a successful  
6 transmission of a streamlet to the particular client.

1           49.     The computer program product of claim 48, the computer program further  
2 comprising code to, upon receipt at the server of a request for a particular streamlet from the  
3 client:

4                 determine if the data map associated with the client indicates that the  
5 already has the requested streamlet; and  
6                 in response to a positive determination, request an updated data map from  
7 the client and replacing the data map with a returned updated map.

1                   50. The computer program product of claim 49, the computer program further  
2 comprising code to adjust a position in the prediction model for the client in accordance with the  
3 requested streamlet.

1                   51. The computer program product of claim 48, the computer program further  
2 comprising code to, upon receipt at the server of an unsolicited data map from the client, replace  
3 the data map in the application status repository for the client with the data map received from  
4 the client.

- 1                   52.     The computer program product of claim 51, the computer program further
- 2                   comprising code to:
  - 3                   compare the data map in the application status repository for the client with the
  - 4                   unsolicited data map received from the client; and
  - 5                   log mismatches identified during the comparing step.